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DIVISION OF AGROSTOLOGY.

[Grass and Forage Plant Investigations.]

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EXPERIMENTS WITH FORAGE PLANTS IN ONTARIO.

The following brief report by Dr. P. Beveridge Kennedy, an assistant in the Division, on a portion of the proceedings of a meeting of the Ontario Agricultural and Experimental Union, held at Guelph, Ont., December 6-8, 1899, and which Dr. Kennedy attended officially, will be of value to many farmers in our northern States.—*F.L.S.*

The large majority of the experiments were carried on with the cereals, root crops, and horticultural plants, while grasses and forage plants were only investigated and experimented with to a small extent.

The following table indicates the gradual development of the Ontario Agricultural and Experimental Union since its foundation. While in 1886 only one experiment was undertaken by 12 experimenters there have been carried on in 1899 twenty-three different experiments by 3,485 experimenters:

The difficulty met with in the proper receipt of reports from the free distribution of seeds is met with by the Ontario Experimental Union to a larger degree than in our Division here.

Cooperative experiments in agriculture for the Province of Ontario.

Years.	No. of different experiments.	No. of experimenters.	Satisfactory reports.
1886	1	12	8
1888	1	90	40
1891	12	208	128
1892	12	754	295
1893	13	1,204	416
1894	14	1,440	504
1895	15	1,699	513
1896	16	2,260	501
1897	18	2,835	610
1898	19	3,028	687
1899	23	3,485	739

It will be seen that out of 3,485 experimenters only 739 sent in satisfactory reports during the season of 1899.

This in a large measure is due to many farmers feeling too keenly their lack of educational ability to write up a report or to fill out the blanks forwarded to them. Sometimes, however, it is due to neglect, or owing to the experiments having resulted in a failure they have not cared to inform anyone of it.

There are 2,505,422 acres of land in Ontario devoted to the growth of hay and clovers.

Within the last thirteen years 72 different varieties of hay and clovers have been experimented with by the Ontario Agricultural College, while 8 varieties have been tested throughout Ontario.

The following grasses have been tested during the season of 1899:

Grasses.

Variety.	Height, first season.	QUANTITY OF HAY PER ACRE.		
		Second season.	Third sea- son.	
Tall Oat Grass	Inches.	Tons.	Tons.	
	11.8	3.0	2.3	
Timothy	6.3	2.7	2.1	
Orchard Grass	10.8	2.0	1.6	
Meadow Fescue	10.2	2.1	1.3	

It is of interest to note that a much larger crop is obtained during the second season than the third. Tall Oat Grass producing 3 tons to the acre during the second season and only 2.3 tons during the third season. The same may be said of Timothy, Orchard Grass, and Meadow Fescue.

An interesting experiment on the different clovers was carried on during the present year. The following table indicates the average height of the clovers for three years during the first season and the tons of green and dry hay per acre produced during the second season:

Clovers.

Variety.	Height, first season (Average for three years).	QUANTITY PER ACRE, SEC- OND SEASON.	
		Green hay.	Dry hay.
Mammoth Red	Inches.	Tons.	Tons.
	9.2	7.3	3.6
Common Red	7.3	6.0	2.4
Alsike	6.8	5.6	2.4
Lucern	7.8	5.3	2.0

Mammoth clover it will be seen produces a much larger amount of fodder both in the green and dry state than the common Red, Alsike, or Lucern clovers in Ontario.

In regard to special crops for green fodder the following results have been obtained for Hairy Vetch, Common Vetch, and Grass Peas:

Vetches.

Variety.	Length of plant (inches).	Tons per acre (5 tests).	
Hairy Vetch	41	9.0	
Common Vetch	29	6.9	
Grass Peas	25	5.1	

It will be seen that Hairy Vetch in amount of forage and tons per acre far exceeds the common Vetch or the Grass Pea. The latter, however, is said to be weevil proof, which is a great advantage in the production of seed.

Three varieties of the early soy beans have been tested and may prove of considerable value in some parts of Ontario.

Soy beans.

Variety.	Estimated value.	YIELD PER ACRE.	
		Straw (tons).	Grain (bushels).
Medium Green	72	2.6	22.4
American Coffee Berry	100	1.4	21.3
Extra Early Dwarf	86	1.1	12.7

While in the District of Columbia, and in the South generally, it is possible to grow three or even four crops of soy beans in a season; in Ontario only one crop can be grown from May to September. From the table it may be gathered that the Medium Green soy bean produces the largest yield of straw as well as the largest amount of grain.

Three varieties of Millets were tested with the following results:

Millets.

Variety.	Estimated value.	Tons per acre of green hay.	
	<i>Two years.</i>	<i>Five tests.</i>	<i>Thirty tests.</i>
Japanese Panicle	100	4.4	6.4
Japanese Barnyard	72	3.7	5.9
Hungarian Grass	62	4.0	4.8

Japanese panicle heads the list with 6.4 tons per acre of green hay.

CRIMSON CLOVER.

The immense value of the use of Crimson Clover as a cover crop was exemplified by Mr. Ghent of New York State.

By delay in tilling the soil in early spring a loss of about 200 tons of water per acre takes place in a single week, while it has been estimated that an acre of meadow grass eliminates from the soil 106 tons of water per acre in twenty-four hours in the month of June.

The soil may be greatly aided in the conservation of moisture by the aid of a cover crop. There are many leguminous crops which may be used for this purpose but Crimson Clover has been found especially valuable in the North. Till very early in the season and continue doing so until the crops are mature, then save the moisture by the use of a cover crop. Crimson Clover is an annual, grows rapidly, and being a legume the growing of it enriches instead of impoverishes the soil. The following table indicates the value of tillage with the use of Crimson Clover:

Tillage with and without crimson clover.

	With three crops of clover.	Without clover.
	<i>Per cent.</i>	<i>Per cent.</i>
Water	15.00	8.75
Nitrogen	.21	.12
Humus	2.94	1.91
Available phosphoric acid	.015	.008

The above shows the great difference in composition of a soil which has had three crops of clover grown upon it and one which has had the same amount of tillage but where no clover has been used. When such results can be obtained the necessity of artificial fertilizers may well be questioned.

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Approved:

JAMES WILSON,

Secretary of Agriculture.

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